

COMPACT INTEGRATED SOLID OXIDE FUEL CELL SYSTEM

ABSTRACT OF THE DISCLOSURE

- 5 A compact integrated solid oxide fuel cell power system includes a fuel cell stack, two stages of heat exchange, and a thermal enclosure. The system includes a recuperator which exchanges heat between exhaust gas, heated by oxidizing unspent gases from the fuel cell stack in a combustion chamber, and incoming oxidant to pre-heat the oxidant. The solid oxide fuel cell stack has an
- 10 internal manifold which exchanges heat between incoming fuel and the pre-heated oxidant. System components are enclosed by thermal insulation. The system may also include a catalytic partial oxidation reformer to pre-heat the fuel during start up. The system can also include an air compressor, fuel storage tank, and pressure relief valve, providing a portable power system. The
- 15 air compressor can be used to pressurize the incoming oxidant to the SOFC stack, and to pressurize the fuel storage tank using the pressure relief valve as a pressure regulator.

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